

Elverson Building (electrical equipment)
319-2. (c. 1924)

THE ELVERSON BUILDING



Complete Electrical Equipment Designed and Installed by

KELLER-PIKE COMPANY

Electrical Engineering Construction

PHILADELPHIA, PA.

ESTABLISHED 1894

INCORPORATED 1904

KELLER PIKE COMPANY

ELECTRICAL ENGINEERING CONSTRUCTION

PHILADELPHIA, PA.

LOUIS W. MOXEY JR., PRESIDENT

J. W. GOHEEN 2ND, VICE PRESIDENT

HOWARD R. MARTIN, SECRETARY

ELECTRICAL EQUIPMENT

of the

ELVERSON BUILDING

THE Elverson Building, Home of The Philadelphia Inquirer, is one of which any Philadelphian may justly be proud. In size and arrangement few other newspaper plants, either in this country or abroad, equals it, while in completeness in electrical equipment and in the modernness and novelty of apparatus it far surpasses all others.

The foundation of the Building was started July, 1923. Owing to the great care which has been used in the preparation of the plans for the work, it was possible to complete the building in a period of time, which, considering the nature of and materials employed in its construction, was extremely short, so that the completed building was turned over to the owner, Colonel James Elverson, Jr., around October 1st of this year, while parts of the building had been in use for several months before that date.



Exterior view, showing City Hall in the distance.

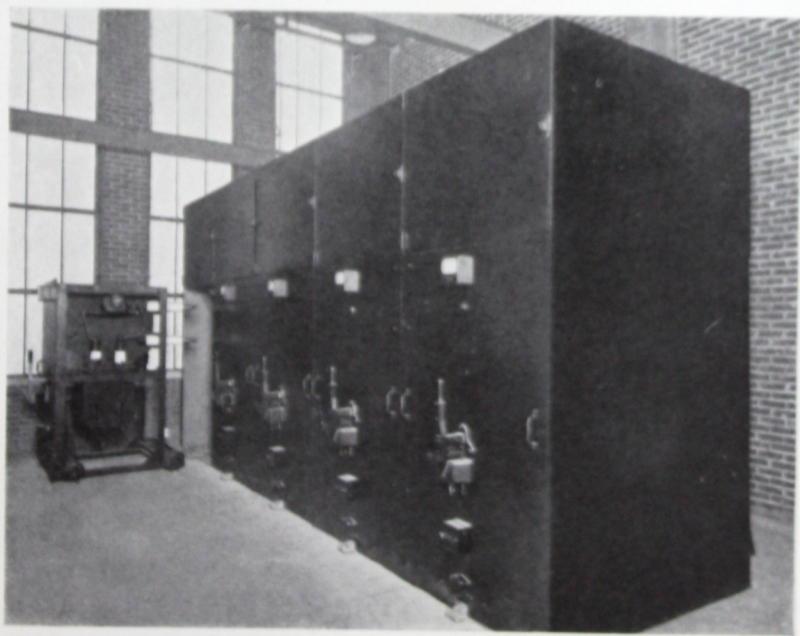
Electric Power

THE Electric Power used is obtained from The Philadelphia Electric Company, two feeders of 3 phase 60 cycle 13,200 volts being brought into the building.

As the building contains no basement, being carried on a steel framework built over the tracks of the Philadelphia and Reading Railway Company, it was necessary to install these feeders in terra cotta conduit laid in concrete. A portion of the run of these feeders is under the Shipping Platform and a portion in the first floor slab. Where these conduits occur in the first floor slab their location is clearly marked by the cement being colored red.

High Tension Control Room

These feeders have been terminated in what is known as the High Tension Control Room. This control board is built of truck type panels recently designed by the Condit Switchboard Company of Boston, and consists of five panels, two controlling the incoming lines, one the motor-generator sets, one the induction power and one the lighting load. A sixth panel is kept in this room for quick replacement in case any panel is crippled by its 15,000 volt oil switch becoming defective.



13,200 V. High Tension Control Board with one truck panel withdrawn, showing disconnects. Truck panels cannot be removed or inserted when oil switch is closed.

Each truck unit contains, besides a set of automatic primary and secondary disconnects, grounding disconnects, mechanical interlocks, suitable barriers, etc., an ammeter, 1-3 P. single throw 800 A. 15,000 volt oil switch, bulls eye, current and potential transformers and a 30 A. 3 P double throw test switch. In the upper compartments of the High Tension Control Board are located the current and potential transformers of the Philadelphia Electric Company.

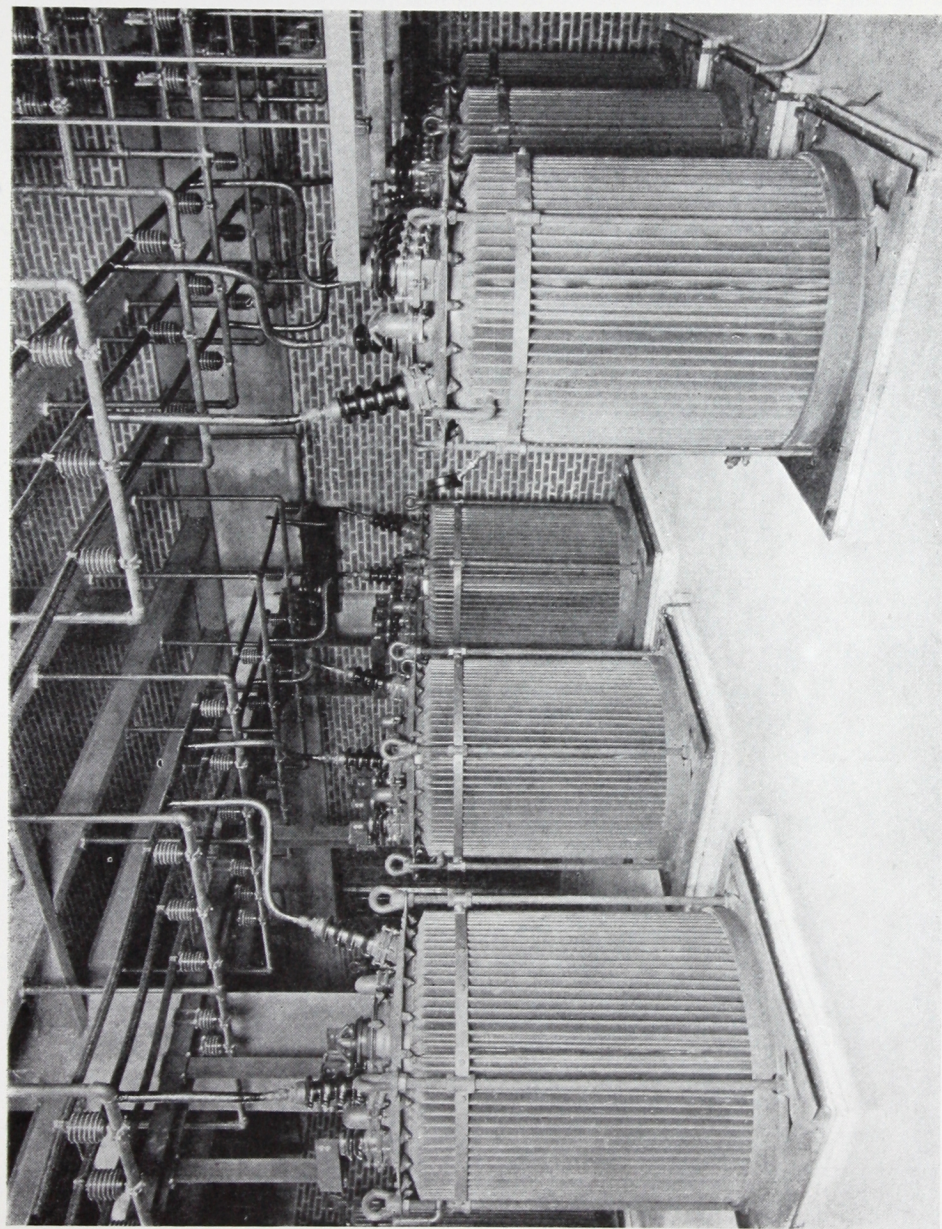
Transformer Room

From the High Tension Control Board 3-13,200 volt feeders are carried into the Transformer Room, and just inside of this room the disconnecting switches for each bank of transformers are placed.

The motor generators are carried on 3-500 K. V. A. 40° 13,200 to 2,200 volts delta connected oil cooled Pittsburgh transformers and of sufficient size to operate the normal printing press load in case of emergency, opened delta.



Showing disconnecting switches in Transformer Room. Through doorway, rear of High Tension Control Board may be seen.



Showing Lighting and Induction Power Transformers 150 K. V. A. and 200 K. V. A. respectively. One of the large 500 K. V. A. Transformers for M.G. Sets may be seen at the extreme left.

The induction power load is carried on 3-200 K. V. A. 40° 13,200 volts to 220 volts delta connected oil cooled Pittsburgh transformers of such size as will permit the operation at opened delta of one passenger elevator, one service elevator, one freight elevator and all motors and heating appliances required for the printing of the newspapers.

The lighting load is carried on 3-150 K. V. A. 40° 13,200 volts to 220-110 volt oil cooled Pittsburgh transformers.

On account of the possibility of providing service on the lighting panel-boards for some small single phase 220 and 110 volt motors, the lighting load is carried on 3 single phase 220-110 volt lines. Transformers normally will only be 75% loaded. Special locking switches have been installed on the secondary bus bars of the lighting transformers, so that the load of any transformer can be transferred temporarily to either one of the remaining transformers. One spare transformer of each size is kept in the Transformer Room for emergency, and all transformers are equipped with Boyce Motor Meters, and 4-2½% taps on primary side.

Main Feeders

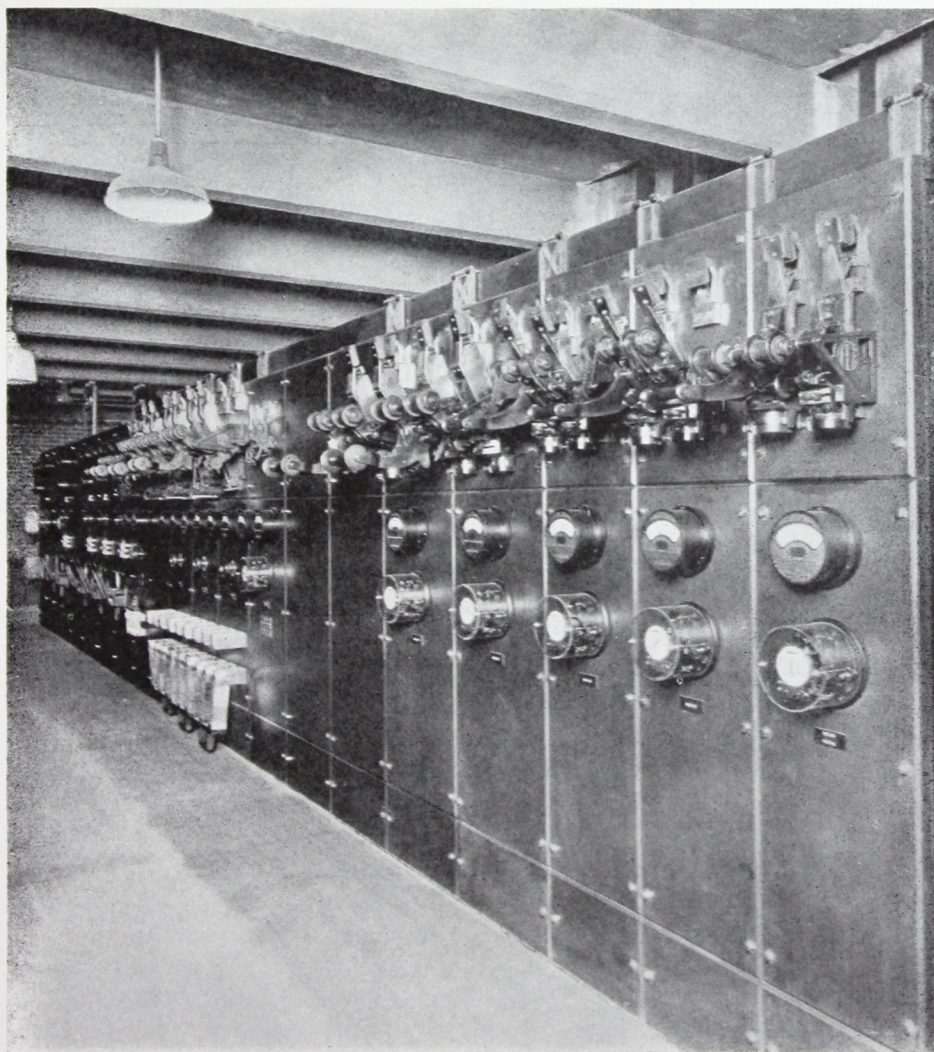
The feeder to the Motor-Generator Switchboard consists of 1-3 phase 60 cycle 2,200 volt circuit run in two parallel lines in proper phase relation and consists of 2-4" conduits each containing a 3 conductor 300,000 C. M. rubber and lead encased cable. The feeder to the Induction Power Switchboard consists of 1-3 phase 60 cycle 220 volt circuit in six parallel lines in proper phase relation and consists of 3-4" conduits each containing 6-500,000 C. M. rubber covered cables. The feeders to the Lighting Switchboard consist of 3 single phase 60 cycle 220-110 volt feeders each run in two parallel lines in proper phase relation consisting of 2-3" conduits each containing 3-500,000 C. M. rubber covered cables.



Press Equipment

THE Printing Press equipment at the present time consists of one colored press operated by 2-60/120 H. P. 220 Volt D. C. motors, two Hoe presses, each operated by 4-60/120 H. P. 220 volt D. C. motors, and one Wood press operated by 4-200/250 H. P. 220 volt D. C. motors.

The Motor-Generator Switchboard consists of twenty-one (21) panels, eight panels controlling the 2,200 volt 3 phase lines to the motors and thirteen panels controlling the 220 Volt D. C. lines from the generators.



Motor Generator Switchboard from 220 Volt D. C. feeder end.

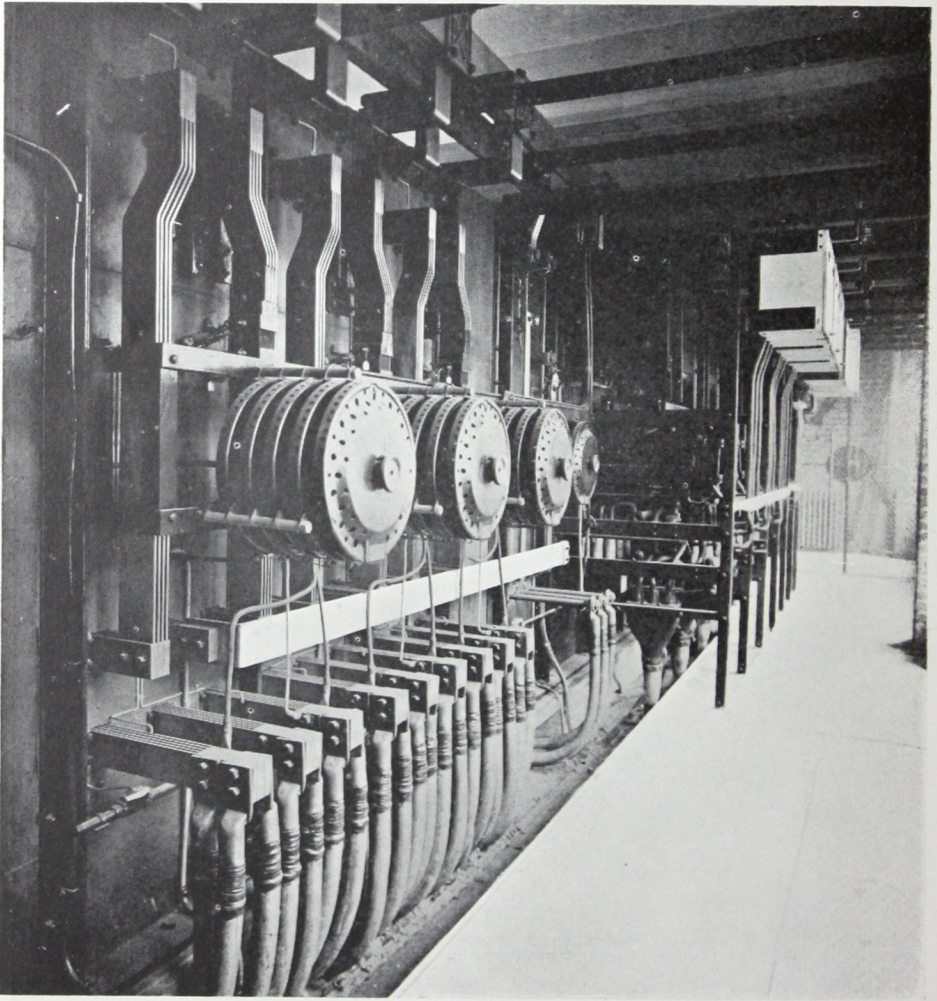
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PANEL No. 1 contains three power factor meters, one for the synchronous power load, one for the induction power load and one for the entire plant, together with two Esterline instruments operated on the high tension side, one recording amperes and the other volts.

PANEL No. 2 contains the watt-hour meter for the synchronous power and total indicating ammeter and volt meter.

PANEL No. 3 contains the main oil switch.

PANEL No. 4 controls the A. C. end of the 150 K. W. M-G. Set.



Rear view of M-G. Switchboard, showing A. C. Control and D. C. Generator Cables.
2,000,000 C. M., lead covered.

PANEL No. 5 for future 500 K. W. M-G. Set.

PANELS Nos. 6, 7 and 8 control the A. C. end of the 3-500 K. W. M-G. Sets.

PANEL No. 9 controls the D. C. end of the 150 K. W. M-G. Set.

PANEL No. 10 for future 500 K. W. M-G. Set.

PANELS Nos. 11, 12 and 13 control the D. C. end of the 3-500 K. W. M-G. Sets.

PANEL No. 14 the total output panel for the D. C. current.

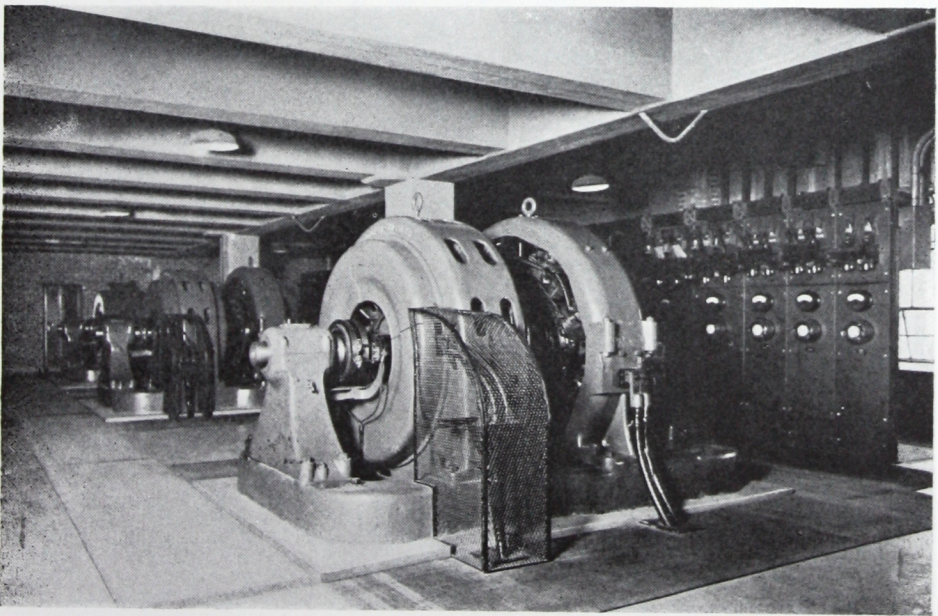
PANELS Nos. 15 and 16, future feeder panels for additional presses.

PANELS Nos. 17 and 18 control the feeders for two Wood presses, one of which is already installed.

PANELS Nos. 19 and 20 control the feeders for two Hoe presses.

PANEL No. 21 controls the feeder for color press.

The Motor Generator equipment consists of 1-150 K. W. D. C. 2 wire 250 volt generator direct connected to a 3 phase 2,200 volt synchronous motor and 3-500 K. W. D. C. 2 wire 250 volt generators direct connected to 2,200 volt synchronous motors. The 500 K. W. units operating at unity power factor and the 150 K. W. unit when operating at full load develops not less than 136 re-active K. V. A.



Showing the 3-500 K. W. Motor Generator Sets, 2,200 V. Terminals, protected by wire screens. Note rubber mats surrounding all apparatus.

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The Motor Generator equipment is of Crocker-Wheeler Company's manufacture, and the Switchboard of Pringle Electrical Manufacturing Company's make.

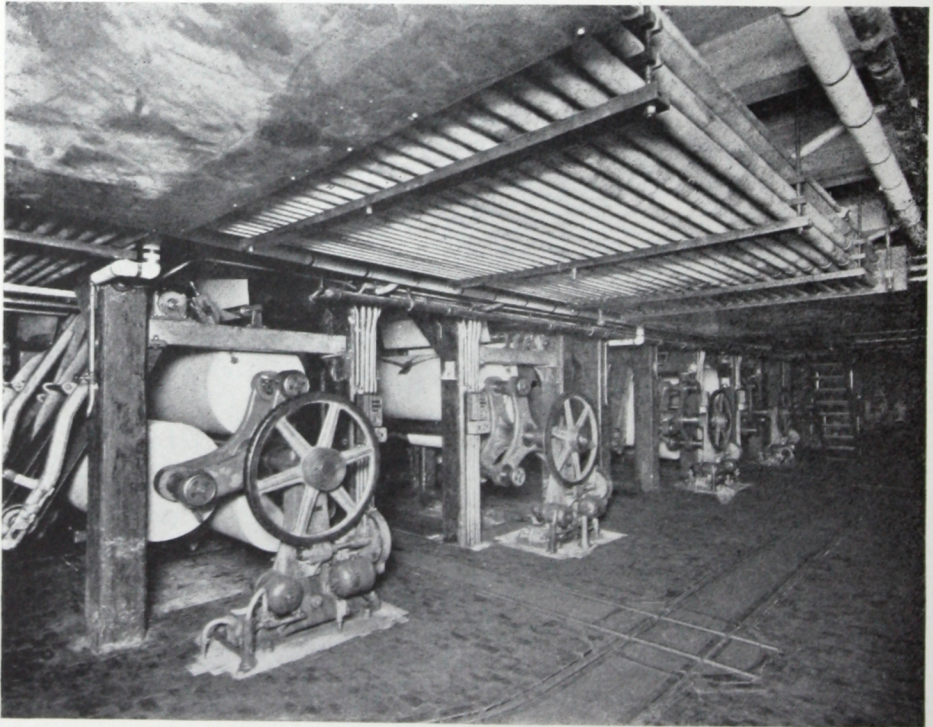
The Press Feeders from the D. C. Switchboard to the Control Board in the Third Floor Mezzanine Gallery consist of copper bus bar work inclosed in a sheet metal and asbestos lined chase. At this latter location is installed the Cutler-Hammer Control Board, and from this board run the mains, control and transfer wiring for the press equipment. The control wiring on the presses is lead encased installed in rigid conduit. No flexible conduit has been used on the presses and all junction boxes and outlet boxes have been made oil proof.

Reel Control

Connected with the Reel Control there are thirty-six (36) forward and reverse motors and thirty-six (36) marginal motors.

The Kohler Magazine Reel enables the pressman to change from an exhausted roll of paper to a new roll without stopping the press.

The electric push button control of the Kohler Magazine Reels places the



Reel Room, showing a portion of the Conduit Lines carrying the Motor Lines, also Reel and Marginal Motors and their Push Button Control.

web in control of the man at the press folder, so that proper margin on the web can be obtained at the folder that is in operation.

By a system of commutating switches operated automatically when the various press combinations are set up, the electric control of the reels is thus transferred to press folder, or folders, to be operated.

Margin and tension control is also obtained by push button stations located at the reel.

Press Control

The Cutler-Hammer control, rightly named "*The Safest in the World*," is used throughout the Press Room.

Over twenty-six hundred horsepower of electrical energy is used with the Cutler-Hammer system in driving the presses. This control includes the largest printing press control ever built by anyone in the entire world. It has exclusive features in that after every movement of the machines, no matter how slight, it automatically returns to a *safe* position, and before it is started a visual and audible signal must be given.

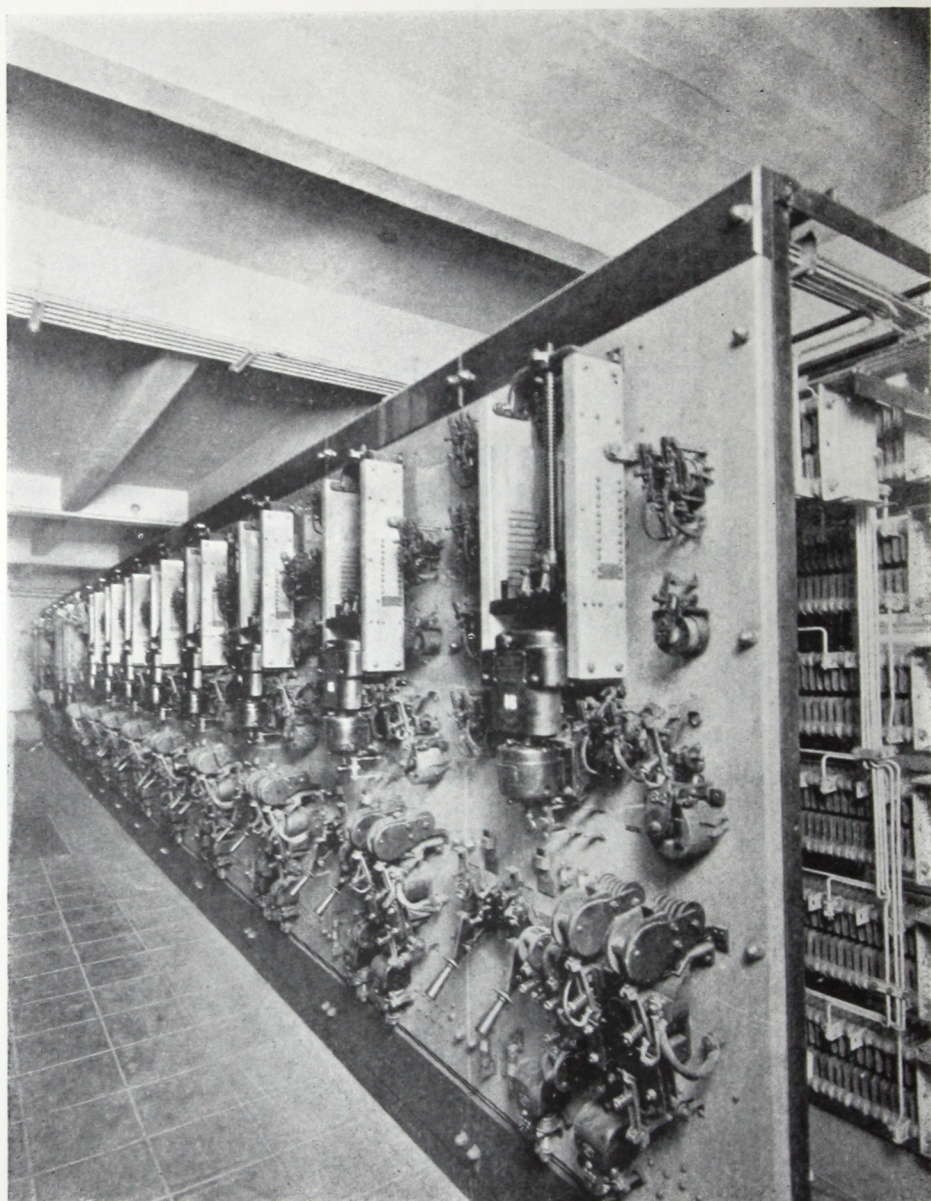
By a series of push buttons located about each machine, it is possible to move the machines as slight as $\frac{1}{8}$ " on cylinders at one time. By these same buttons it is possible to accelerate to any speed from 10 R. P. M. up to 600 or 144,000 24-page papers per hour for the Hoe machines and 288,000 24-page paper per hour for the Wood machine, or to decelerate back to zero.

If any undue overload occurs or the sheet breaks, the machines automatically stop in seven to ten seconds from full speed. In fact, every safety device for operators and machinery is included in this system.

On each printing couplet are attached Electric Cylinder Brakes which work on the same principle as the air brakes on a Pullman train except that the electric brakes are automatic, and always apply the proper braking effect in proportion to the speed and load on the machines.

On each 12 unit press are four equipments arranged to operate separately or in unison with one another. There are 64 control stations on each 12 unit machine, whereby it is possible to control every movement of the huge presses simply by pressing a button.

No expense has been spared, and every device known of real value has been employed in the control and operation of the presses to reach the maximum of efficiency and production in producing the enormous circulation of The Inquirer of nearly half a million copies.



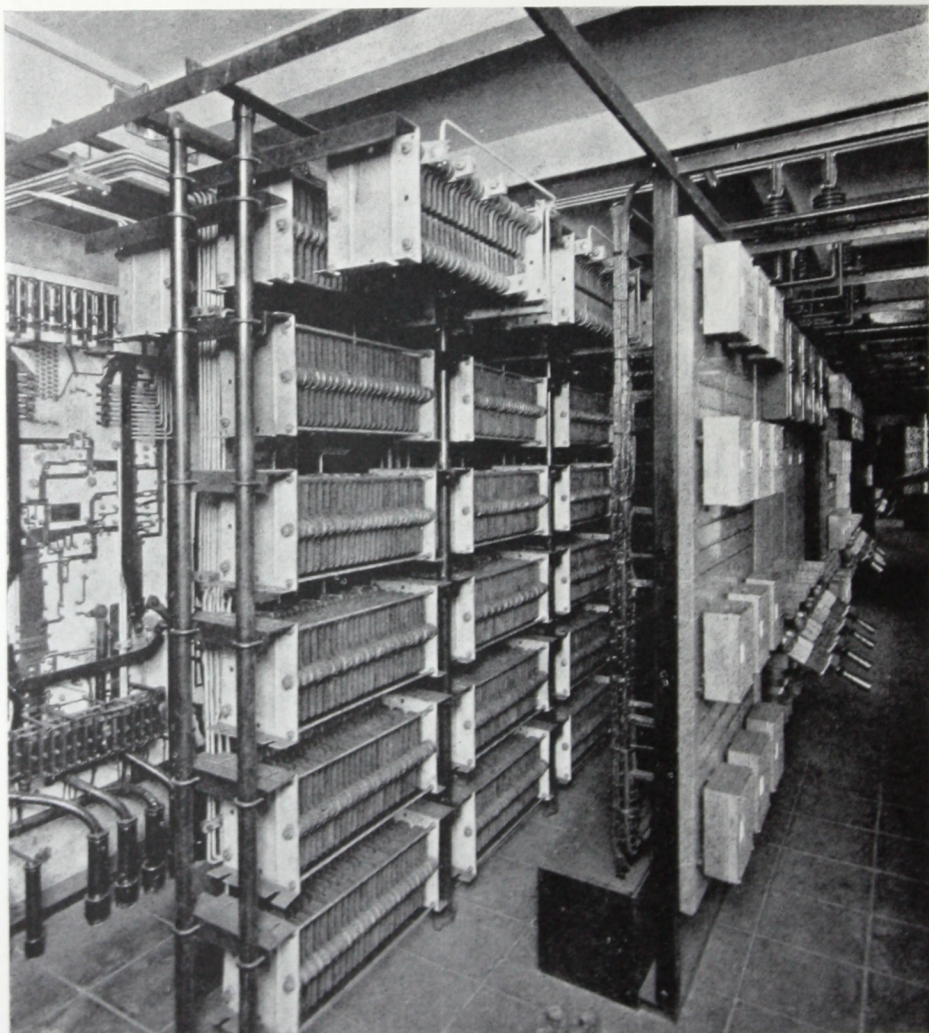
Showing front view of Cutler-Hammer Press Control Switchboard for 8-120/240 H. P. Motors and 4-200/250 H. P. Motors.



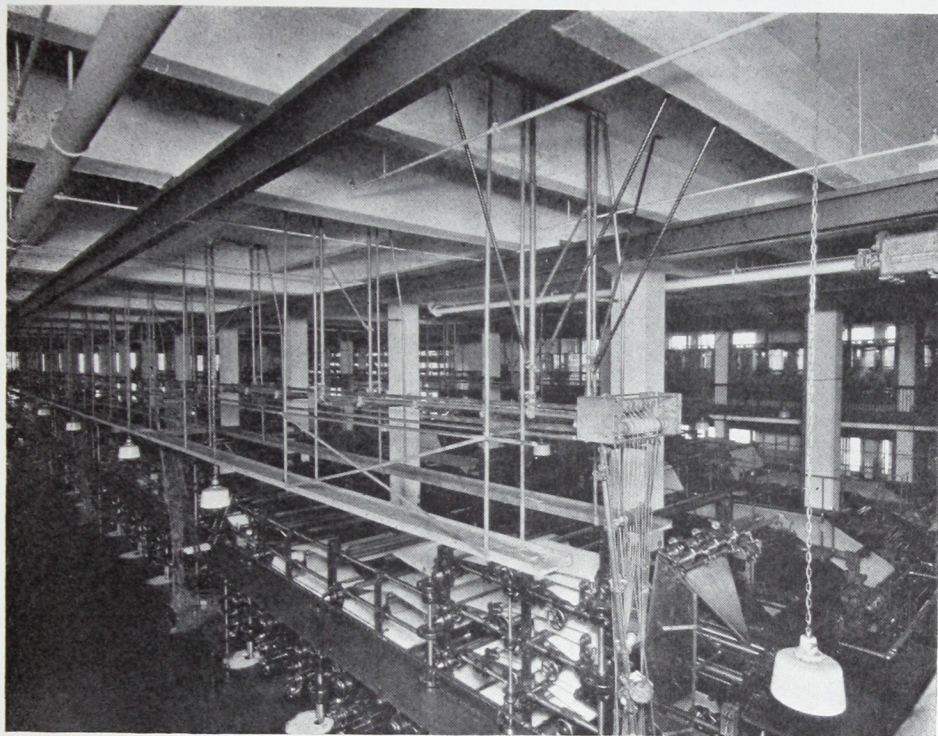
Rear view of Cutler-Hammer Press Control Switchboard showing Grids
and Wiring to same.

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Another time and money-saving device is the Conveyor built by the Cutler-Hammer Company, which takes the papers from the delivery of the presses and carries them to the mailing room, a distance ranging from 100 to 250 feet, and delivers the papers on tables in bundles of 50, where they are tied and sent by moving belts and chutes to the delivery trucks.



Rear of Press Control Switchboard Room, showing the Transfer Panels, Wiring to same Disconnecting Switches and Recording Ammeters for each Press Motor.



Main Press Room, showing the 12 Unit Wood Press, largest in the world, requiring approximately 1,000 H. P. at full load, and the Conveyor, which takes the papers from the delivery of the Presses and carries them to the Mailing Room.

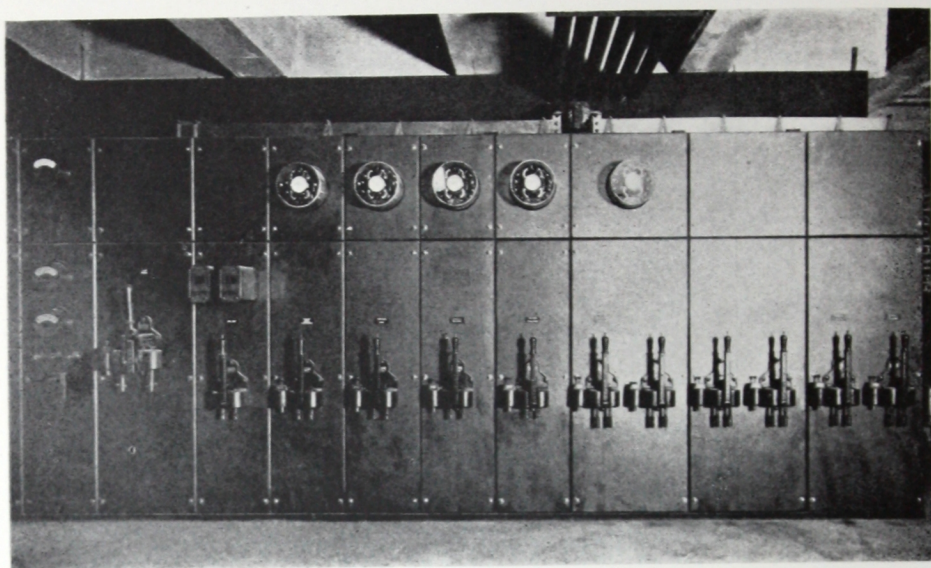
Induction Power

THE induction power throughout the building is controlled from the induction power switchboard in Switchboard Room. This switchboard consists of ten panels, and at the top of the board running the entire length of the same is an asbestos board junction box. The risers from the oil switches to the junction box are of copper bar, no insulated cables being used back of the board.

PANEL No. 1 contains a volt-meter and ammeter with necessary plugs for reading the voltage and amperes on each phase, together with a complete set of ground lamps.

PANEL No. 2 contains the main oil breaker.

PANEL No. 3 is the Fire Pump panel, which contains a locked oil switch with instantaneous type of relays set for 400% overload.



Front view of Induction Power Switchboard, showing Feeder Lines
from Transformer Room.

This latter panel is connected ahead of the main oil breaker, so that the Fire Pump, which is of 150 H. P. capacity, will operate up to 400% overload before opening the circuit. At 400% overload the current will still be well under the maximum capacity of the main 13,200 volt oil switch controlling the power bank of transformers.

PANEL No. 4 contains the oil circuit breaker controlling all motors connected with the heating, water and ice cooling systems.

PANEL No. 5 contains the oil circuit breaker controlling all conveyor motors, arc lamps and the miscellaneous motors not connected with the Composing and Auto Plate Rooms.

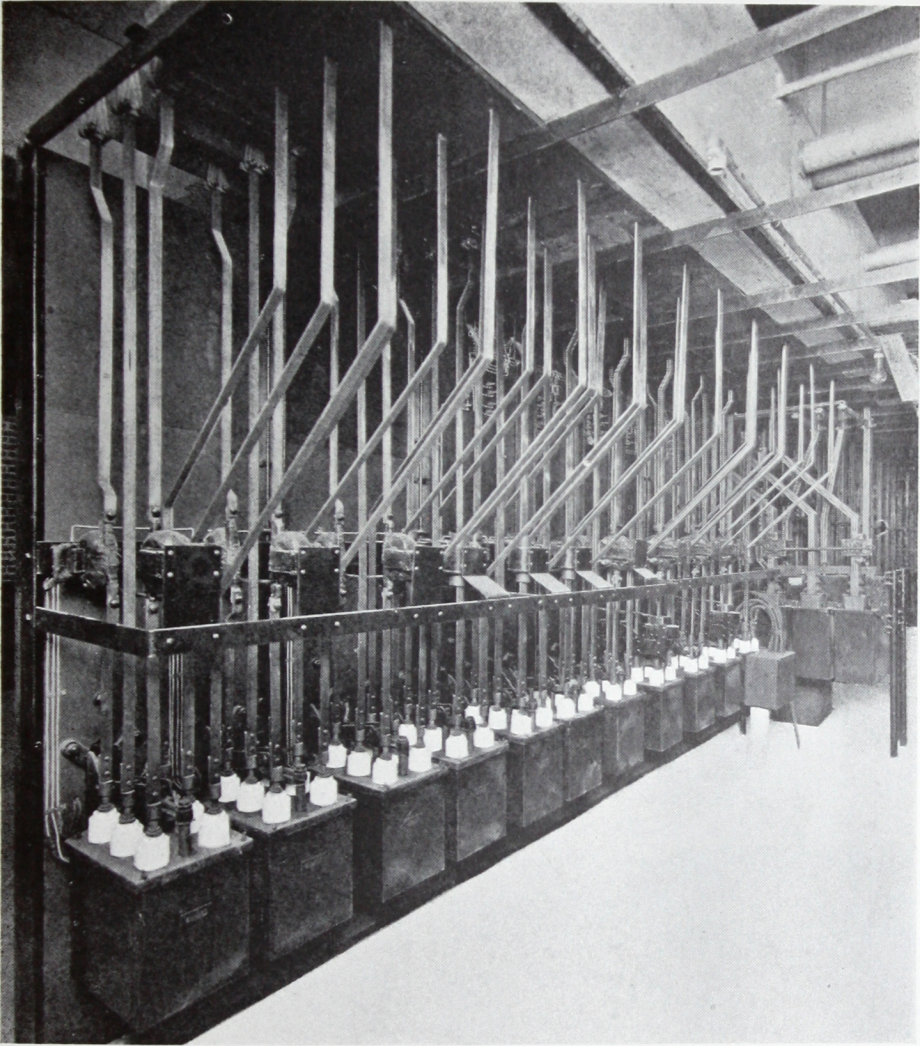
PANEL No. 6 contains the oil circuit breaker controlling all motors on the auto plate machines.

PANEL No. 7 contains the oil circuit breaker controlling all motors and heating units in the Composing Room.

PANEL No. 8 contains two oil circuit breakers controlling two banks of passenger elevators.

PANEL No. 9 contains two oil circuit breakers controlling the service and freight elevators.

PANEL No. 10 contains two oil circuit breakers controlling three paper lifts. All types of power are metered at the switchboard.



Rear view of Induction Power Switchboard, showing Copper Risers from Oil Switches to Junction Box. At the extreme right may be seen the rear of the Lighting Switchboard.

From the main switchboard the various power feeders extend along the ceiling of the first floor to the different pipe shafts, where they rise to the various main centers of distribution.

The total connected load in motors is approximately 1,000 H. P., and for heating units approximately 250 K. W.

Each center of distribution is equipped with main switch and individual fused circuit switches.

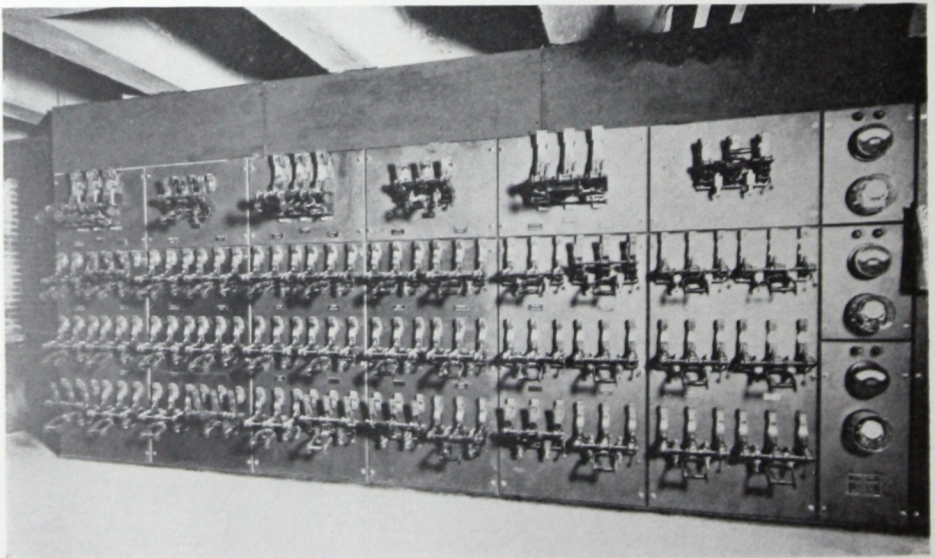
On account of the necessity of having a minimum number of interruptions, all motors and heating units required for the newspaper departments are each on a separate circuit.

Lighting

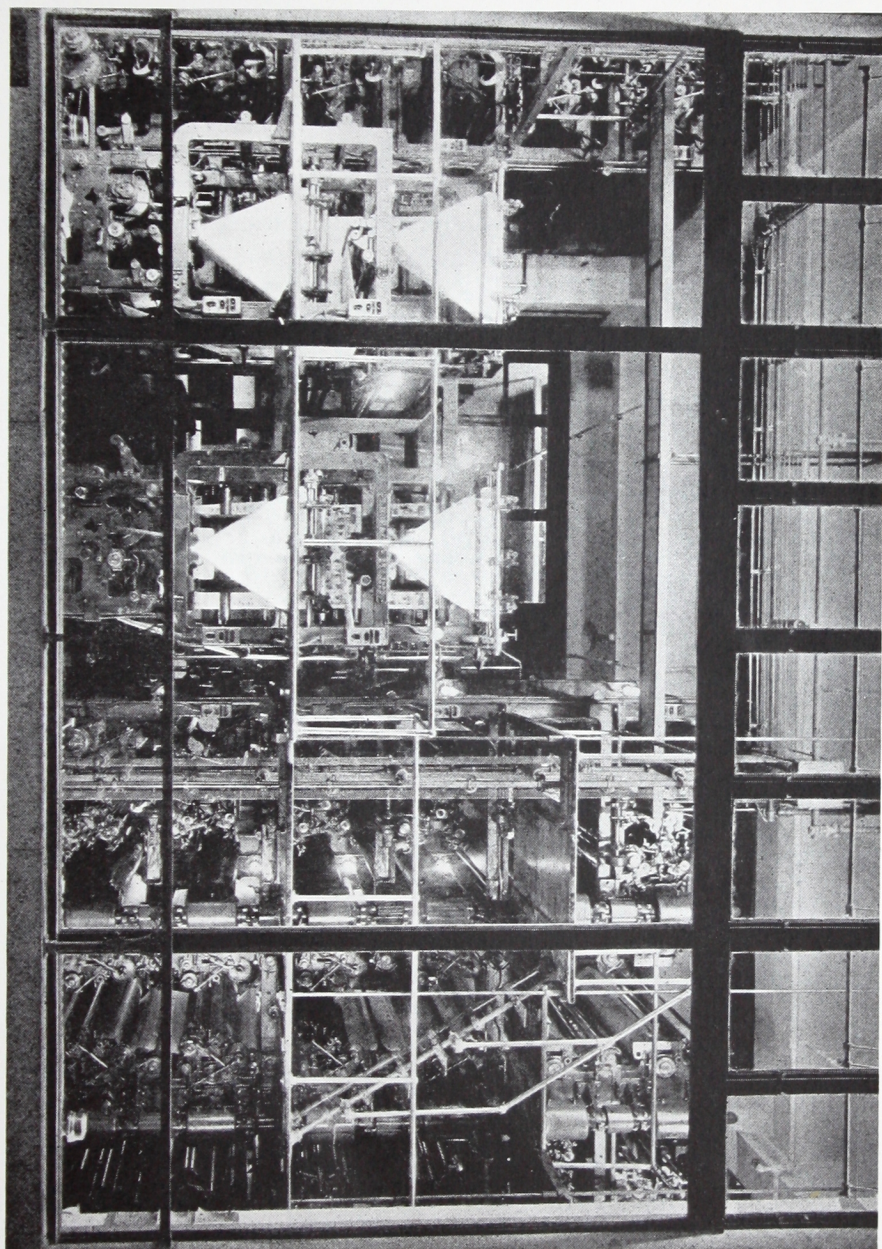
MAIN Lighting Switchboard is located in the Switchboard Room and consists of seven panels, and at the top of the board running the entire length of the same is an asbestos board junction box.

Panel No. 1 contains the total watthour meters for each phase, volt meter for each phase and ammeter and plug for reading the amperes of each phase. Each phase as it enters the Switchboard passes through an 800 Amp. I.T.E. circuit breaker, and for the Light mains there are required 39-3P. I.T.E. circuit breakers in sizes from 30 to 400 A. The risers from the circuit breakers to the junction box above are of copper bar.

Throughout the Printing Department no one floor is fed by one main. This eliminates, in case of the opening of a circuit breaker, all of the floor being placed in darkness, and the individual lights on these floors, such as paper storage floor, reel room floor and press room floor, are controlled in groups, by remote control switches at the centers of distribution, operated from momentary contact switches at the exits from the floors and at such other points as might be necessary for a convenient control.



Front view of Lighting Switchboard, showing Feeder Lines from Transformer Room.



Partial view of Color Press taken under artificial illumination with X-Ray Reflectors
through glass windows from Broad Street.

Each fire tower is on a separate main for white lights, and all red fire lights are on one main. A separate main also feeds the corridors and elevator lights in the Office section of the building.

The main feeding the panelboard controlling lights in Boiler Room, High Tension Control Room, Transformer Room, Switchboard Room and Motor-Generator Room is equipped with an automatic switch and balancing coil, so that in case of failure of the lighting current, this main is automatically transferred to the induction power lines, thus assuring light at all times in the power plant portions of the building.

The lantern at the top of the building contains 16-500 watt units, eight of them being white and eight red. These lights are operated from the tower clock mechanism, so that they automatically are thrown in and out, depending upon the time of the day, and when in, the white light remains on except at quarter after the hour, when one red flash takes place, at half after the hour when two red flashes take place, at quarter of the hour when three red flashes take place, and on the hour when four red flashes take place followed by the number of white flashes of the hour. The approximate candle power of the lantern is 400,000. When near the Building eight distinct rays of light may be seen, but at a distance these rays overlap and give the appearance of one unit.

As the space between the clock face and the columns of the building is only 13", each clock face required the installation of 200-10 watt lamps to give an even illumination and avoid all spotting effects. These lights are likewise controlled automatically from the Tower Clock mechanism.

Besides the automatic control of the Lantern and clock face lights, they can be controlled manually by remote control switches operated from momentary contact switches in Elevator Dispatcher's Room, First Floor, and the Executive Offices, Third Floor.

The building is flood lighted from the Fifth Floor up by the use of 134 X-Ray units, ranging in size from 250 watt diffusing and concentrating type to 500 watt concentrating type.

The flood lighting equipment is controlled by remote control switch operated by momentary contact switches in the Elevator Dispatchers' Room, First Floor, and in the Executive Office on Third Floor. The circuit breaker on the Lighting Switchboard controlling this line is equipped with time element relay.

In all cases, except for eighteen units, the flood lighting fixtures are installed concealed on the building.

The total lighting load is approximately 500 K. W.

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Special Systems

BESIDES the Electric Light and Power Systems described above, the Electrical Equipment also comprises a complete Telephone Conduit System for Bell and Keystone Phones, a complete P. A. X. Automatic System, Watchman's Time Detector System, Synchronous Time Clock, Time Stamp and Employees' Recorders Systems, Telegraph and Associated News Systems, Fire Alarm, Annunciator and Burglar Alarm Systems.



Near view of Tower, showing rays of light from Lantern at top.
Total C. P. approximately 400,000.



The Elverson Building at night as seen from Thirteenth Street.